EXHIBIT

14

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF NEW YORK

Allen HARPER, José LEON, and Ranfis PEREZ on behalf of themselves and all others similarly situated; and the RELEASE AGING PEOPLE IN PRISON CAMPAIGN ("RAPP"), Plaintiffs, v. ANDREW CUOMO, in his official capacity as the Governor of the State of New York; NEW YORK STATE DEPARTMENT OF CORRECTIONS AND COMMUNITY SUPERVISION; ANTHONY J. ANNUCCI, in his official capacity as the Acting Commissioner of the New York State Department of Corrections and Community Supervision; JOHN MORLEY, M.D., in his official capacity as the Deputy Commissioner and Chief Medical Officer of the New York State Department of Corrections and Community Supervision; and JEFFREY TEDFORD, in his official capacity as the Superintendent of Adirondack Correctional Facility Defendants.	Civil Action No. 9:21-cv-19 (LEK/ML)

DECLARATION OF JEFFREY L. SHAMAN

I, Jeffrey L. Shaman, hereby state as follows:

1. I am over the age of eighteen and am competent to make this Declaration.

2. I am a full-time professor at Columbia University in the Department of Environmental Health Sciences at the Mailman School of Public Health. I am Director of the Climate and Health Program and Associate Chair of the Earth Institute Faculty. My research

focus is principally the study of the survival, transmission and ecology of infectious agents, including the effects of meteorological and hydrological conditions on these processes. My work to date has primarily focused on mosquito-borne and respiratory pathogens. I use mathematical and statistical models to describe, understand, and forecast the transmission dynamics of these disease systems.

3. I have studied infectious diseases for 20+ years. I hold a BA in Biology from the University of Pennsylvania and a PhD in Climate Science from Columbia University.

4. My research has been funded by multiple agencies including the National Institutes of Health, National Science Foundation, Department of Defense, Centers for Disease Control and Prevention (CDC), National Oceanic and Atmospheric Administration, and National Aeronautics and Space Administration.

5. My work is at the vanguard of infectious disease modeling and forecasting. My group won the first CDC Predict the Influenza Challenge and has brought the use of model-inference systems, i.e. mathematical models coupled with Bayesian inference approaches, to the fore of infectious disease epidemiology.

6. My C.V. is attached as Exhibit A.

7. I am donating my time preparing this Declaration and any live testimony *pro bono.*

8. I have not previously testified as an expert by declaration or at trial.

What are the particular dangers associated with COVID-19 within a prison/congregate living environment?

9. Coronavirus disease 2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a respiratory virus that emerged in humans during 2019. Following the initial emergence, the virus rapidly spread from its epicenter in China throughout the world. This spread was facilitated by two epidemiological characteristics that make the virus very difficult to contain: 1) it is a newly emerged respiratory virus to which the vast majority of humans appear to have little pre-existing immunity; and 2) the majority of infections caused by SARS-CoV-2 are subclinical but still contagious, facilitating high rates of transmission from persons unaware of their own infection. The former property implies that most persons are susceptible to infection with SARS-CoV-2. The latter property indicates that, for most, the infection is mild or asymptomatic and thus does not disrupt these individuals from their normal routines of interaction — e.g., going to work, shopping, using public transit, plane travel. Because asymptomatic, mildly symptomatic, and even pre-symptomatic infections are contagious, there exist ample opportunities for a host to unknowingly spread the virus.

10. The sole activity of a virus is replication, which it accomplishes by invading another organism and commandeering the cellular machinery of that host to produce copies of itself. These copies are then disseminated to other cells within the host, as well as to the environment for transmission to another host.

11. Infectious hosts shed the SARS-CoV-2 virus principally in the oral and nasal mucosa of the respiratory tract. During breathing, speaking, singing, coughing and sneezing, persons expel droplets from the respiratory tract into the environment. Some of the droplets from an infectious individual will contain the virus, which can infect a naïve host upon contact with

the respiratory tract or eyes of that host. A number of modes of transmission can, in theory, support this transfer of virus, including droplet spray, aerosolization and sedimentation on objects with which a naïve host comes in contact. It remains unclear which mode or modes of transmission are most important. As a consequence, it is important that people socially distance, wear masks, ventilate rooms and wash hands to guard against all potential modes of transmission.

12. The spread of the SARS-CoV-2 virus is facilitated by opportunities for person-to-person transmission. It is these opportunities that sustain the virus in the broader community by providing it new hosts to exploit. Crowded indoor environments with poor ventilation, little social distancing and no mask use are optimal settings for virus transmission. Poor ventilation limits the mixing and dilution of droplets and aerosols containing the virus, and thus concentrates the pathogen increasing the chances of transmission. Limited social distancing allows spread by droplets and spray. A lack of masks enables spread by droplets and aerosols.

13. Infectious individuals in crowded indoor environments with poor ventilation, little social distancing and no mask use can spread the virus to one or more individuals. There are many documented instances in which numerous individuals were infected with SARS-CoV-2 at an indoor event (a party, a bar, a choir practice) by a single infectious individual. These "superspreader" events can transmit the virus to dozens of others.

14. Dense congregate environments, such as prisons, nursing homes, and long-term care facilities, are prime localities for the spread of SARS-CoV-2. These indoor settings with individuals in unavoidable close contact provide opportunity for superspreading events, the

establishment of sustained chains of transmission, and spillover, through staff and visitors, to the broader community.[1]

15. However, spread in these congregate settings is not inevitable; the risk of transmission can be minimized through sensible public health and testing policies. Modeling work I have performed simulating SARS-CoV-2 transmission in nursing home settings indicates that testing of both staff and visitors entering a facility can help prevent the introduction and spread of the virus within the facility. It is similarly advisable to regularly test employees, people being transferred into prisons, and visitors to prisons, prior to entry, in order to screen for infection and prevent introduction of the virus into the facility.

16. Because testing is not without error, due to slow turnaround or suboptimal test sensitivity, it is advisable to test prison staff as often as possible and all visitors upon each visit. In addition, prisoners should be routinely tested to determine if the virus has leaked into the facility. By testing the prisoners often, chains of transmission can be identified earlier, before many individuals are infected. Routine, sensitive, rapid turnaround testing of staff, visitors and prisoners, in addition to social distancing, personal protective equipment, ventilation and surface cleaning are essential tools for limiting introduction of the virus and outbreaks in prison environments. Further, rates of testing should increase as infection rates in the broader community increase.

17. Elderly prisoners, particularly those with certain chronic conditions such as diabetes, hypertension, chronic respiratory disease, and cardiovascular disease, are at elevated risk of adverse outcomes, hospitalization and death following infection with SARS-CoV-2.

[1] Stuart A. Kinner, et al., *Prisons and custodial settings are part of a comprehensive response to COVID-19*, 5 THE LANCET PUBLIC HEALTH 4, e188 (2020), *available at* https://www.thelancet.com/action/showPdf?pii=S2468-2667%2820%2930058-X.

18. Most transmission occurs from infectious persons who are not aware of their infection. The majority of SARS-CoV-2 infections are undocumented, i.e. individuals who are never tested and confirmed as having an infection. Most undocumented infectious individuals experience mild or no symptoms and as a consequence do not alter their normal routines of going to work or school, shopping, and social interactions. Further, among those whose symptoms are more severe and who are tested and confirmed as having an infection, contagiousness typically commences 2-3 days prior to the onset of symptoms. This pre-symptomatic shedding is another means by which infected individuals unknowingly transmit SARS-CoV-2. As a consequence, the virus can spread for some time among individuals within a setting, such as a prison, before being detected through identification of a symptomatic infection.

What are the risks of community spread in the larger community once COVID-19 is in a prison, and what are the impacts on hospital capacity/community healthcare resources in the event of an outbreak within a prison?

19. The percentage of the population still susceptible to SARS-CoV-2 infection remains high in most areas of the country, including upstate New York. This high susceptibility can readily support transmission in the community.

20. In the larger community, elderly persons, the immunocompromised, and those with conditions such as cancer, diabetes, hypertension, chronic pulmonary disease and cardiovascular disease are particularly at risk of experiencing adverse outcomes upon infection with SARS-CoV-2

21. The virus is very difficult to contain once present in a community as the majority of transmission occurs from people unaware of their infection.

22. As seen presently (as of December 6, 2020) hospital resources are stretched in much of the country. Hospitalizations for COVID-19 are at record levels and some hospitals have asked infected healthcare personnel to work in order to avoid personnel shortages. Such circumstances degrade the quality of patient care and need to be avoided by limiting transmission in the community.

23. Prisons are not operated in isolation. Corrections officers, staff, visitors and medical personnel enter and exit the prison environment daily, and residents are transferred among prisons. This movement of people into and out of the prison provides opportunities for introducing SARS-CoV-2 into the prison population and for acquiring the virus and bringing it back to surrounding communities. This potential movement of the virus between community and prison, which is often unobserved, allows prisons to act as reservoirs for the disease and disruptors of care services in the broader community. Specifically, the virus, once introduced, can spread rapidly in the closed prison environment, infecting many prisoners at once. Such elevated infection rates not only increase the risk of virus spillover to surrounding communities but also can strain local hospital resources through a flood of sick prisoners and compromise bed availability.[2]

Where are things currently in the lifecycle of the COVID-19 disease?

24. During the next 3-4 months, spread of the virus will be very difficult to control. There are a number of reasons for this.

25. Presently (as of December 6, 2020), community infection rates, the fraction of the population infected with SARS-CoV-2, are at record levels in the US. My group at Columbia

[2] Dan Noyes, *San Quentin coronavirus: Inmate shares how massive COVID-19 outbreak started*, ABC 7 NEWS (July 8, 2020), available at https://abc7news.com/san-quentin-covid-cases-coronavirus-19-death-row/6307270/.

University estimates that 1% of the United States population is actively infected with the virus, i.e. contagious, and another 1% is latently infected.

26. The virus thrives off opportunities for person-to-person transmission, which are most abundant when people gather indoors. During the coming winter months, people will spend more time indoors, both at home and when going outside the home to shop, dine, etc., which will increase person-to-person contact indoors.

27. The risks associated with increased indoor person-to-person contact are particularly acute in congregate living environments.

28. Evidence indicates the SARS-CoV-2 virus is more transmissible when conditions are colder and drier as they are during winter. Dryness, i.e. low humidity, is particularly problematic, as this condition seems to increase virus viability outside the host, and, unlike temperature, humidity indoors is not generally regulated. As a consequence, humidity conditions are often very dry indoors during winter, which appears to support more transmission of SARS-CoV-2. Sensitivity to humidity is well-documented for influenza, and a similar seasonal cycle of wintertime transmission is observed for other human coronaviruses.

29. As community spread increases, so does the risk that staff will bring the virus into congregate living environments, increasing the risk there.

30. SARS-CoV-2 has been present in the United States for nearly a year. Since March, it has significantly disrupted day-to-day activity, interaction and commerce. Understandably, people are tired of the virus—tired of not seeing their families, tired of not traveling, tired of not engaging with the world as they had previously. This fatigue, which leads to lapses in social distancing and other non-pharmaceutical interventions, may provide additional transmission opportunities for the virus.

31. Effective vaccines began to be rolled out during December 2020; however, there will not be enough doses delivered to sufficient numbers of people to end the pandemic in the US until late spring or summer 2021 or later. Further, many people may refuse the vaccine. Over the next months, we will have to continue our reliance on non-pharmaceutical interventions to control the virus.

32. Given these circumstances, I expect one hundred thousand or more cases per day in the United States for the next 2 months. Since December 6, 2020, the U.S. 7-day moving average of new cases has exceeded 200,000 per day. These levels are more than double the rates experienced during the peak of the summer wave. While this rate of case accrual may not persist at such a high level, I expect it will take some time to drop below one hundred thousand new cases per day.

I declare under penalty of perjury that the foregoing is true and correct.

EXECUTED WITHIN THE UNITED STATES ON: _____, 2021.

BY: _____

Jeffrey L. Shaman

EXHIBIT

A

Jeffrey Shaman
Curriculum Vitae

Department of Environmental Health Sciences
Mailman School of Public Health, Columbia University
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Allan Rosenfield Building, Room 1104E
New York, NY 10032
www.columbia.edu/~jls106

AREAS OF INTEREST: Climate and health, infectious disease transmission and epidemiology, mosquito-borne disease, mosquito ecology, modeling and prediction of infectious disease, large-scale climate dynamics, tropical meteorology, climate prediction, the hydrologic cycle

EDUCATION:

University of Pennsylvania, Bachelor of Arts in Biology, *Cum Laude* with honors in the major, 1990
Columbia University, Master of Arts, Department of Earth and Environmental Sciences, 2000
Columbia University, Master of Philosophy, Department of Earth and Environmental Sciences, 2002
Columbia University, Doctor of Philosophy, Department of Earth and Environmental Sciences, 2003, Awarded with Distinction
Harvard University, National Oceanic and Atmospheric Administration Post-Doctoral Fellow in Climate and Global Change, 2003-2005

APPOINTMENTS:

Professor, Department of Environmental Health Sciences, Mailman School of Public Health, Columbia University, 2019-present
Director, Climate and Health Program, Mailman School of Public Health, Columbia University, 2017-present
Associate Professor, Department of Environmental Health Sciences, Mailman School of Public Health, Columbia University, 2014-2018
Co-Director, Climate and Health Program, Mailman School of Public Health, Columbia University, 2014-2016
Assistant Professor, Department of Environmental Health Sciences, Mailman School of Public Health, Columbia University, 2011-2014
Assistant Professor, College of Oceanic and Atmospheric Sciences, Oregon State University, 2005-2011
National Oceanic and Atmospheric Administration Post-Doctoral Fellow, Harvard University, 2003-2005
National Aeronautics and Space Administration Earth System Science Fellow (graduate), 2000-2003
Laboratory Technician, Children's Hospital of Philadelphia and the University of Pennsylvania. Immunological research involving molecular and cellular experimentation investigating the class II system and its genetic expression, 1992-1994
Field Researcher, The University of Pennsylvania. Plant biology surveys, experimentation and research of forest regrowth and plant community competition, 1990-1991

AFFILIATIONS:

Associate Chair, Earth Institute Faculty, Columbia University, 2020-present
Earth Institute, Columbia University, Faculty Member, 2020-present
Data Science Institute, Columbia University, Affiliate Member, 2017-present
American Museum of Natural History, Division of Invertebrate Zoology, Research Associate, 2016-present
Columbia Center for Environmental Health in Northern Manhattan, Mailman School of Public Health, Columbia University, 2011-present
International Research Institute for Climate and Society, Columbia University, 2011-present
Earth Institute, Columbia University, Associate Faculty Member, 2016-2020
Earth Institute, Columbia University, Junior Faculty Fellow, 2012-2016
Institute for Social and Economic Research and Policy, Columbia University, Faculty Fellow, 2012-2018 College of Earth, Oceanic and Atmospheric Sciences, Oregon State University, Courtesy, 2011-2014
Center for Communicable Disease Dynamics, Harvard School of Public Health, 2009-2015

GRADUATE AND POSTDOCTORAL ADVISORS:

Mark A. Cane, Columbia University (graduate)
Eli Tziperman, Harvard University (post-doctoral)

AWARDS:

Dean's Excellence in Faculty Leadership Award, Mailman School of Public Health, 2020
International Society for Disease Surveillance Outstanding Research Article in Biosurveillance in the Scientific Achievement Category, first prize (for Pei et al., 2018), 2018
Tow Faculty Leadership Award, Mailman School of Public Health, 2015-2018
Winner, Centers for Disease Control and Prevention 'Predict the Influenza Season Challenge', 2014
International Society for Disease Surveillance Outstanding Research Article in Biosurveillance in the Scientific Achievement Category, first prize (for Shaman and Karspeck, 2012), 2013
Junior Faculty Career Development Award, Columbia University Center for Environmental Health in Northern Manhattan, 2012-2014
National Oceanic and Atmospheric Administration Post-Doctoral Fellowship in Climate and Global Change, 2003-2005
Bruce C. Heezen Prize for graduate students making exceptional scientific contributions, 2003
Columbia Sigma Xi, 2003
Ph.D. Awarded with Distinction, 2003
NASA Earth System Science Fellowship, 2000-2003

MANUSCRIPTS IN REVIEW AND PRESS:

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Keyes KM, Kandula S, Olfson M, Gould MS, Martinez-Ales G, Rutherford C, Shaman J. Suicide and the agent-host-environment triad: leveraging surveillance sources to inform prevention. Accepted.
Galanti M, Shaman J. Direct observation of multiple subsequent infections with endemic coronaviruses. *Accepted.*
Branas CC, Rundle A, Pei S, Yang W, Carr BG, Sims S, Zebrowski A, Doorley R, Schluger N, Quinn JW, Shaman J. Flattening the curve before it flattens us: hospital critical care capacity limits and mortality from novel coronavirus (SARS-CoV2) cases in US counties - 3 and 6 week projections from April 2, 2020. *In review.*
Lamb MR, Kandula S, Shaman J. Differential COVID-19 case positivity in New York City neighborhoods: socioeconomic factors and mobility. *Accepted.*
Ukawuba I, Shaman J. Use of climate in a simple entomological model of malaria transmission. *In preparation.*
Yang W, Kandula S, Huynh M, Greene SK, Van Wye G, Li W, Chan HT, McGibbon E, Yeung A, Olson D, Fine A, Shaman J. Estimating the infection fatality risk of COVID-19 in New York City during the spring 2020 pandemic wave: a model-based analysis. *Accepted.*
Rader B, White LF, Burns MR, Chen J, Brilliant J, Cohen J, Shaman J, Brilliant L, Hawkins J, Scarpino SV, Astley CM, Brownstein JS. Mask wearing and control of SARS-CoV-2 transmission in the United States. *In review.*
Lewandowski SA, Kioumourtzoglou MA, Shaman JL. Heat stress illness outcomes and annual indices of outdoor heat at U.S. Army installations. *In submission.*
Ma, Y. S. Pei, J. Shaman, R. Dubrow and K. Chen. Role of air temperature and humidity in the transmission of SARS-CoV-2 in the United States. *In revision.*
Martinez-Ales G, Pamplin II, JR, Rutherford C, Gimbrone C, Kandula S, Olson M, Gould MS, Shaman J, Keyes KM. Age, period, and cohort effects on suicide death in the US from 1999 to 2017: moderation by sex, race, and firearm involvement. *In submission.*

PEER REVIEWED PUBLICATIONS:

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Pei S, Kandula S, Shaman J. Differential Effects of Intervention Timing on COVID-19 Spread in the United States. *Science Advances,* **6(49)**:eabd6370, doi:10.1126/sciadv.abd6370, 2020.
Pei S, Dahl K, Yamana TK, Licker R, Shaman J. Compound risks of hurricane evacuation amid the COVID-19 pandemic in the United States. *GeoHealth,* **4(12)**:e2020GH000319, doi:10.1029/2020GH000319, 2020.
Cruz AT, Shaman J, Dayan P. The challenge of clearly counting COVID-19 cases in children. *Pediatrics,* **146(6)**:e2020031682, doi:10.1542/peds.2020-027425, 2020.
Bomfim R, Pei S, Shaman J, Yamana T, Makse HA, Andrade Jr. JS, Lima Neto AS, Furtado V. Predicting dengue outbreaks at neighborhood level using human mobility in urban areas. *Journal of the Royal Society Interface,* **17(171)**:20200691, doi:10.1098/rsif.2020.0691, 2020..
Shaman J, Galanti M. Will SARS-CoV-2 become endemic? *Science,* **370(6516)**:527-529, doi:10.1126/science.abe5960, 2020.
Kramer SC, Pei S, Shaman J. Forecasting influenza in Europe using a metapopulation model incorporating cross-border commuting and air travel. *PLOS Computational Biology,* **16(10)**:e1008233, doi:10.1371/journal.pcbi.1008233, 2020.

Pei S, Shaman J. Aggregating forecasts of multiple respiratory pathogens supports more accurate forecasting of influenza-like illness. *PLOS Computational Biology,* **16(10)**:e1008301, doi:10.1371/journal.pcbi.1008301, 2020.

Galanti M, Comito D, Ligon C, Lane B, Matienzo N, Ibrahim S, Shittu A, Tagne E, Birger R, Ud-Dean M, Filip I, Morita H, Rabadan R, Anthony S, Freyer GA, Dayan P, Shopsin B, Shaman J. Active surveillance documents rates of clinical care seeking due to respiratory illness. *Influenza and Other Respiratory Viruses,* **14(5)**:499-506, doi:10.1111/irv.12753, 2020.

Emeruwa UN, Ona S, Shaman J, Turitz A, Wright JD, Gyamfi-Bannerman C, Melamed A. Associations between built environment, neighborhood socioeconomic status and SARS-CoV-2 infection among pregnant women in New York City. *JAMA,* **324(4)**:390-392, doi:10.1001/jama.2020.11370, 2020.

Shea B, Knowlton K, Shaman J. The state of climate-health education at health professions schools: a baseline assessment. *JAMA Open Network,* **3(5)**:e206609, doi:10.1001/jamanetworkopen.2020.6609, 2020.

Li R, Pei S, Chen B, Song Y, Zhang T, Yang W, Shaman J. Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV2). *Science,* **368(6490)**:489-493, doi:10.1126/science.abb3221, 2020.

Gervais M, Shaman J, Kushnir Y. Impact of the North Atlantic Warming Hole on sensible weather. *Journal of Climate,* **33(10)**:4255-4271, doi:10.1175/JCLI-D-1909636.1, 2020.

Heaney A, Alexander K, Shaman J. Ensemble forecast and parameter inference of childhood diarrhea in Chobe District, Botswana. *Epidemics,* **30**:100372, doi:10.1016.jepidem.2019.100372,2020.

Yamana TK, Shaman J. A framework for evaluating the effects of observational type and quality on vector-borne disease forecast. *Epidemics,* **30**:100359, doi:10.1016.jepidem.2019.100359,2020.

Krasna H, Czabanowska K, Jiang S, Khadka S, Morita H, Kornfeld J, Shaman J. The future of careers at the intersection of climate change and public health: What can job postings and an employer survey tell us? *International Journal of Environmental Research and Public Health,* **17(4)**:1310, doi:10.3390/ijerph170418310, 2020.

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Heaney A, Shaman J, Alexander K. El Nino-Southern Oscillation and under-5 diarrhea in Botswana. *Nature Communications,* **10**:5798, doi:10.1038/s41467-019-13584-6, 2019.

Reich NG, McGowan C, Yamana T, Tushar A, Ray E, Osthus D, Kandula S, Fox S, Brooks L, Crawford-Crudell W, Gibson GC, Moore E, Silva R, Biggerstaff M, Johansson MA, Rosenfeld R, Shaman J. A collaborative multi-model ensemble for real-time influenza forecasting in the U.S.: Results from the 2017/2018 season. *PLOS Computational Biology,* **15(11)**:e1007486, doi:10.1371/journal.pcbi.1007486, 2019..

Johansson M et al. Advancing probabilistic epidemic forecasting through an open challenge: The Dengue Forecasting Project. *Proceedings of the National Academy of Sciences,* **116(48)**:24268-24274, doi:10.1073/pnas.1909865116, 2019.

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Kandula S, Shaman J. Near-term forecasts of influenza-like illness: an evaluation of autoregressive time series approaches. *Epidemics,* **27**:41-51, doi:10.1016/j.epidem.2019.01.002, 2019.

Li X, Xu B, Shaman J. The impact of environmental transmission and epidemiological features on the geographical translocation of highly pathogenic avian influenza virus. *International Journal of Environmental Research and Public Health,* **16(11)**:1890, doi:10.3390/ijerph16111890, 2019.

Li X, Xu B, Shaman J. Pathobiological features that favor the intercontinental dissemination of highly pathogenic avian influenza virus H5N8. *Royal Society Open,* **6**:190276, doi:10.1098/rsos.190276, 2019.

Gervais M, Shaman J, Kushnir Y. Impacts of the North Atlantic warming hole in future climate projections: mean atmospheric circulation and the North Atlantic jet. *Journal of Climate,* **32(10)**:2673-2689, doi:10.1175/JCLI-D-18-0647.1, 2019.

Galanti M, Birger R, Ud-Dean SMM, Filip I, Morita H, Comito D, Anthony S, Freyer GA, Ibrahim S, Lane B, Matienzo M, Ligon C, Rabadan R, Shittu A, Tagne E, Shaman J. Symptoms of respiratory viral infections across age groups. *Epidemiology and Infection,* **147**:e176, 1-6, doi:10.1017/S0950268819000505, 2019.

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Galanti M, Birger R, Ud-Dean SMM, Filip I, Morita H, Comito D, Anthony S, Freyer GA, Ibrahim S, Lane B, Ligon C, Rabadan R, Shittu A, Tagne E, Shaman J. Longitudinal active sampling for respiratory viral infections across age groups. *Influenza and Other Respiratory Viruses,* **13(3)**:226-232, doi:10.1111/irv.12629, 2019.

Reis J, Yamana T, Kandula S, Shaman J. Superensemble forecast of respiratory syncytial virus outbreaks at regional, state and municipal levels. *Epidemics,* **26**:1-8, doi:10.1016/j.epidem.2018.07.001, 2019,

Kramer SC, Shaman J. Development and validation of influenza forecasting for 64 temperate and tropical countries. *PLOS Computational Biology,* **15(2)**:e1006742, doi:10.1371/journal.pcbi.1006742, 2019.

Pei S, Cane MA, Shaman J. Predictability in process-based ensemble forecast of influenza. *PLOS Computational Biology,* **15(2)**:e1006783, doi:10.1371/journal.pcbi.1006783, 2019.

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Reich NG, Brooks L, Fox S, Kandula S, McGowan C, Moore E, Osthus D, Ray E, Tushar A, Yamana T, Biggerstaff M, Johansson MA, Rosenfeld R, Shaman J. Forecasting seasonal influenza in the U.S.: a collaborative multi-year, multi-model assessment of forecast performance. *Proceedings of the National Academy of Sciences,* **116(8)**:3146-3154, doi:10.1073/pnas.1812594116, 2019.

Pei S, Morone F, Liljeros F, Makse HA, Shaman J. Inference of the nosocomial transmission dynamics of Methicillin-resistant *Staphylococcus aureus*. *eLife,* **7**:e40977, doi:10.7554/eLife.40977, 2018.

Alexander K, Heaney A, Shaman J. Distant climate controls and dryland flood pulse dynamics influence diarrheal disease and population vulnerability to climate change. *PLOS Medicine,* **15(11)**:e1002688, doi:10.1371/journal.pmed.1002688, 2018.

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ARXIV, BIORXIV, MEDRXIV POSTINGS

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Chattopadhyay I, Kiciman E, Elliott J, Shaman J, Rzhetsky AA. Conjunction of factors triggering waves of seasonal influenza. *bioRxiv*: 168476; doi: https://doi.org/10.1101/168476, 2017.
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Yang W, Shaman J. A simple modification to improving inference for non-linear dynamical systems. *ArXiv*: 1403.6804 [stat.ME], 2014.
Shaman J, Karspeck A, Lipsitch M. Week 1 Influenza Forecast for the 2012-2013 U.S. Season. *ArXiv*: 1301.3110 [q-bio.PE], 2013.
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Shaman J, Karspeck A, Lipsitch M. Week 51 Influenza Forecast for the 2012-2013 U.S. Season. *ArXiv*: 1212.6678 [q-bio.PE], 2012.
Shaman J, Karspeck A, Lipsitch M. Week 50 Influenza Forecast for the 2012-2013 U.S. Season. *ArXiv*: 1212.5750 [q-bio.PE], 2012.
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PUBLISHED ABSTRACTS AND CONFERENCE PROCEEDINGS

Zollner G, Shaman J, Sithiprasasna R, Vaughan JA, Coleman RE, 2005. Using a dynamic hydrology model to quantify seasonal changes in breeding habitat preferences of Anopheles larvae in western Thailand, American Journal of Tropical Medicine and Hygiene, **73**(6):149-149, Supplement S.
Shaman J and E Tziperman, 2005. ENSO and South Asian Monsoons, *Bulletin of the American Meteorological Society,* **86**:333-334.
Rutledge, RC, Day JF, Ross GK and J Shaman, 2004. Arbovirus surveillance in Florida: Getting closer to real time. 22nd International Congress of Entomology, Brisbane, Australia, 15-21 August.
Shaman J, Stieglitz M, Zebiak S, Cane M, Day J., 2003. A Local Forecast of Land Surface Wetness Conditions, Drought, and St. Louis Encephalitis Virus Transmission Derived from Seasonal Climate Predictions. *Proceedings of the World Water and Environmental Resources Congress 2003.* pp. 10.
Busch R, vonScheven E, Amaya M, Shaman J, Mellins ED. Biochemical analysis of a mutant HLA-DM molecule containing a Cys79 beta->Tyr mutation. *Human Immunology* **47**: (1-2) O489-O489, 1996.

EXPOSITORY PUBLICATIONS

Shaman J, 2020. An estimation of undetected COVID cases. *Nature,* doi:10.1038/d41586-020-03513-9.
George D, Taylor W, Shaman J, Rivers C, Paul B, O'Toole T, Johansson MA, Hirschman L, Biggerstaff M, Asher J, Reich N, 2019. Technology to advance infectious disease forecasting for outbreak management. *Nature Communications* **10**: Article number 3932, doi:10.1038/s41467-019-11901-7.
Shaman J, 2018. Pandemic Preparedness and Forecast. *Nature Microbiology* **3**:265-267, doi:10.1038/s41564-018-0117-7.
Rivers C, Alexander K, Bellan S, Del Valle S, Drake JM, Eisenberg JNS, Eubank S, Ferrari M, Halloran ME, Galvani A, Lewis BL, Lewnard J, Lofgren E, Macal C, Marathe M, Ndeffo Mbah ML, Meyer LA, Meza R, Park A, Porco T, Scarpino SV, Shaman J, Vespignani A, Yang W, 2014. Ebola: models do more than forecast. *Nature* **515**(7528):492, doi:10.1038/515492a.
Halloran ME, Vespignani A, Bharti N, Feldstein LR, Alexander KA, Ferrari M, Shaman J, Drake JM, Porco T, Eisenberg JNS, Del Valle SY, Lofgren E, Scarpino SV, Eisenberg MC, Gao D, Hyman JM, Eubank S, Longini IM, 2014. Ebola: Mobility data. *Science* **346**(6208):443, doi: 10.1126/science.346.6208.433-a.
Shaman J, 2005. Malaria Mapping and Prevention, *Geotimes,* **50**:18-21.

BOOK CHAPTERS

Day JF, Shaman J, 2011, 'Mosquito-Borne Arboviral Surveillance and the Prediction of Disease Outbreaks', In *Flavivirus Encephalitis,* Daniel Růžek, Ed., ISBN: 978-953-307-669-0, InTech, Available from: http://www.intechopen.com/articles/show/title/mosquito-borne-arboviral-surveillance-and-the-prediction-of-disease-outbreaks

FUNDING

NASA, Earth System Science Graduate Fellowship, Columbia University: 'Prediction of Mosquito Abundance with a Land Surface Hydrology Model and Landsat Thematic Mapper Imagery', September 2000-May 2003.
Lamont-Doherty Earth Observatory Climate Center Grant: 'Prediction of Mosquito Abundance with a Land Surface Hydrology Model', J. Shaman and M. Stieglitz, 2000.
Columbia Earth Institute, SMART Award: 'Prediction of Mosquito Abundance with Land Surface Hydrology Model', J. Shaman and M. Stieglitz, 2000.
International Research Institute for Climate Prediction Seed Funding Grant: 'Catchment Based Modeling of Kenyan Hydrology Using Dynamically Downscaled Model Runs', J. Shaman, M. Stieglitz, L. Sun, M. Cane, 2001.
Lamont-Doherty Earth Observatory Climate Center Grant: 'Spatial Reconstructions of Land Surface Wetness with a TOPMODEL-based Dynamic Hydrology Model', J. Shaman and M. Stieglitz, 2001.
Black Rock Forest Consortium Grant Award: 'Proposal to Purchase Telemetry Equipment for Installation at the Tower Sites in Glycerine Hollow', J. Shaman, V. Engel and M. Stieglitz, 2002.
NOAA, Post-Doctoral Fellowship in Climate and Global Change, Harvard University, September 2003-August 2005.
Harvard University Center for the Environment Faculty Research Project Award: 'Population Dynamics of *Culiseta melanura* and their Relationship with Environmental Conditions', T. Kiszewski, R. Pollack, J. Shaman, A. Spielman, E. Tziperman, 2003.
NIH Models of Infectious Disease Agent Study (MIDAS); Subaward through the Harvard School of Public Health: 'Modeling the Seasonality of Influenza using Absolute Humidity'. Key investigtor; subaward PI. September 15, 2009-August 31, 2014.
NSF, Climate and Large-Scale Dynamics Grant: 'Collaborative Research: The ENSO-Mediterranean Teleconnection: Observations and Dynamics. PI. August 1, 2009-July 31, 2012. (Extended through July 31, 2014 via no-cost extension.)
Medical Research Foundation (Oregon Health Sciences University): 'Weather and psychosocial influences on seasonal depression in at-risk males from adolescence to young adulthood', Co-I, December 2010-November 2011.
NIH/NSF, Division of Mathematical Sciences/National Institute of General Medical Sciences, Joint Initiative to Support Research at the Interface of the Biological and Mathematical Sciences: 'Influenza Outbreak Prediction: Applying Data Assimilation Methodologies to Make Skillful Forecasts of an Inherently Chaotic, Nonlinear System', PI. August 1, 2011-July 31, 2017.
Columbia Earth Institute Cross-Cutting Initiative: 'Impact of climate variability and urbanization on water storage practices and vector-borne disease incidence: Developing an understanding for risk prediction and response using Delhi, India as context', Co-PI, September 2011-August 2012.
Columbia University Center for Environmental Health in Northern Manhattan: 'Exploring Environmental Controls on Airborne Respiratory Pathogens in Public Spaces in Northern Manhattan', PI, December 2011.
Columbia University Center for Environmental Health in Northern Manhattan, Junior Faculty Career Development Award: 'The Mechanisms of Influenza Survival and Transmission', PI, April 2012-March 2014.
Columbia Earth Institute Junior Faculty Research Award: 'The Staphylococcal Cloud -- Its Role in Household Transmission', PI, July 2013 - June 2014.
NIH Models of Infectious Disease Agent Study (MIDAS)/ Health and Human Services Biomedical Advanced Research and Development Authority (BARDA); Supplemental award dispensed through the Harvard School of Public Health NIH MIDAS center grant: 'Real-Time Prediction of Influenza', PI, September 2013 - August 2014.
NSF, Climate and Large-Scale Dynamics Grant: 'Collaborative Research: Combined Influence of Snow Cover and El Nino/ Southern Oscillation (ENSO) on North African/Mediterranean Temperature and Precipitation'. PI. December 1, 2013-November 30, 2016.
NSF, Climate and Large-Scale Dynamics Grant: 'Support for a Symposium Honoring Mark Cane's Contribution to Climate Science; Palisades, NY; October 20-21, 2014', Co-I. June 1, 2014 - May 31, 2015.
NIH, National Institute of Environmental Health Sciences (NIEHS) Ruth Kirchstein T32 Training Grant: 'Interdisciplinary Training in Climate and Health', Co-PI. July 2014 - June 2019.
NIH, National Institute of General Medical Sciences (NIGMS) Models of Infectious Disease Agent Study (MIDAS): 'Development and Dissemination of Operational Real-Time Respiratory Virus Forecast', PI. September 1, 2014 - June 30, 2019.
DOD, Defense Threat Reduction Agency (DTRA): 'Developing Real-Time Forecasts of Infectious Diseases', PI. January 23, 2015 - January 22, 2019.
DOD, Defense Advanced Research Projects Agency (DARPA): 'The Virome of Manhattan: A Testbed for Radically Advancing Understanding and Forecast of Viral Respiratory Infections', PI. March 1, 2016 - December 31, 2020.

NSF, Division of Information and Intelligent Systems: 'EAGER: Collaborative Research: Combining Community and Clinical Data for Augmenting Influenza Modeling', PI. September 1, 2016 - August 31, 2018.
Rockefeller Foundation: 'Global Consortium on Climate and Health Education', PI. January 1, 2017 - December 31, 2017.
Research Initiatives in Science and Engineering, Columbia University: 'Evolution in the Arctic: Genomic reconstruction of microbial, plant and animal communities during the Holocene', PI. July 1, 2018 - June 30, 2020.
NIH, National Institute of Allergy and Infectious Disease: 'Disease Persistence and Population Dynamics: Modeling Measles under Mass Vaccination', Co-I. July 1, 2019 - June 30 2024.
CDC, Centers for Disease Control and Prevention: 'Multifaceted Control Strategies for Seasonal and Pandemic Influenza', PI, August 1, 2019 - January 31, 2021.
NIH, National Institute of Mental Health: 'Suicide as a contagion: modeling and forecasting emergent outbreaks', MPI, January 24, 2020 - November 30, 2024.
NSF, Division of Mathematical Sciences: 'RAPID: Inference, Forecasting, and Intervention Modeling of COVID-19', PI, April 15, 2020 - March 31, 2021.
Morris-Singer Foundation; 'Columbia Prediction of Infectious Diseases', PI, June 1, 2020 - May 31, 2022.
Regeneron: 'Projections of COVID-19', PI, June 1, 2020 - December 31, 2020.
NIH, National Institute of Environmental Health Sciences: 'Advanced training in environmental health and data science: molecules to populations', MPI, July 1, 2020 - June 30, 2025.
CDC, Centers for Disease Control and Prevention: 'Inference, forecasting and optimal control of healthcare-associated infections', MPI, August 1, 2020 - July 31, 2025.
CDC, Centers for Disease Control and Prevention: 'Supplement: Inference, forecasting and optimal control of healthcare-associated infections', MPI, August 1, 2020 - July 31, 2021.
Pfizer: 'Projecting future adult symptomatic attack rates in counties with potential vaccine efficacy trial sites in the United States', PI, July 1, 2020 - October 31, 2020.
CSTE, Council of State and Territorial Epidemiologists: 'Heterogeneous forecast and nowcast of COVID-19 at county scale', PI, September 1, 2020 - August 31, 2021.
Pfizer: 'Evaluating the direct and indirect effects of the Pfizer COVID-19 vaccine under different distribution schema', PI, October 1, 2020 - March 31, 2021.

INVITED UNIVERSITY, INSTITUTE, AND GOVERNMENT TALKS

University of Miami, Rosenstiel School of Marine and Atmospheric Science, Division of Meteorology and Physical Oceanography, 'Monitoring and Forecasting St. Louis Encepqhalitis Transmission in Florida', November 19, 2002.
Harvard University, School of Public Health, Department of Epidemiology, 'Monitoring and Forecasting St. Louis Encephalitis Transmission in Florida', February 20, 2003.
Massachusetts Institute of Technology, Department of Civil and Environmental Engineering, 'The Effect of ENSO on the South Asian monsoons', April 8, 2004.
Lamont-Doherty Earth Observatory of Columbia University, Division of Ocean and Climate Physics, 'The Effect of ENSO on the South Asian monsoons', October 11, 2004.
Georgia Institute of Technology, School of Earth and Atmospheric Sciences, 'From Mosquitoes to Monsoons', October 22, 2004.
Oregon State University, College of Oceanic and Atmospheric Sciences, 'Some Effects of ENSO on the South Asian monsoons', March 31, 2005.
Oregon State University, College of Oceanic and Atmospheric Sciences, 'Monitoring and Forecasting Mosquito-Borne Disease Transmission, April 1, 2005.
Massachusetts Institute of Technology, Department of Earth and Atmospheric Sciences, 'Some Effects of ENSO on the South Asian monsoons', April 27, 2005.
Oregon State University, Department of Statistics, 'Monitoring and Forecasting Mosquito-Borne Disease Transmission, April 17, 2006.
University of Washington, Department of Atmospheric Sciences, 'Dynamics of the ENSO-Indian Monsoon Teleconnection', April 27, 2007.
Hatfield Marine Science Center, 'Hydrologic and Meteorological Determinants of Mosquito-Borne Disease Transmission', May 3, 2007.
Harvard University, Department of Earth and Planetary Sciences, 'Dynamics of the ENSO-Indian Monsoon Teleconnection', August 14, 2007.
Princeton University, Program in Science, Technology and Environmental Policy, Woodrow Wilson School, 'Operational Hydrologic Monitoring of Mosquito-Borne Disease Transmission: The Science and Policy', February 4, 2008.
University of California, Los Angeles, Institute for Geophysics and Planetary Physics, 'Operational Hydrologic Monitoring of Mosquito-Borne Disease', April 1, 2008.
Stanford University, Department of Earth Environmental System Science, 'The ENSO-North African-Asian Jet Teleconnection: Dynamics and Implications', November 5, 2008.
Harvard University, School of Public Health, Department of Epidemiology, 'Influenza and Humidity', February 9, 2009.
Harvard University, Department of Earth and Planetary Sciences, 'Influenza and Humidity', February 10, 2009.

Colorado State University, Department of Atmospheric Sciences, 'The ENSO-North African-Asian Jet Teleconnection: Dynamics and Implications', April 16, 2009.
Columbia University, Department of Environmental Health Science, 'Absolute Humidity and the Transmission and Seasonality of Influenza', November 2, 2009.
International Research Institute for Climate and Society, 'Absolute Humidity and the Transmission and Seasonality of Influenza', November 4, 2009.
University of California, Berkeley, Department of Geography, 'Absolute Humidity and the Transmission and Seasonality of Influenza', September 29, 2010.
National Center for Atmospheric Research, Climate and Global Dynamics Division, 'Complex Wavenumber Rossby Wave Ray Tracing', August 18, 2011.
National Center for Atmospheric Research, Climate and Global Dynamics Division and Research Applications Laboratory, 'Absolute Humidity and the Survival, Transmission and Seasonality of Influenza', August 24, 2011.
Harvard University, Department of Earth and Planetary Sciences, 'Complex Wavenumber Rossby Wave Ray Tracing', April 19, 2012.
Stony Brook University, School of Marine and Atmospheric Sciences, 'The ENSO-Pandemic Influenza Connection: Coincident or Causal?', August 29, 2012.
Virginia Polytechnic Institute and State University, Department of Civil and Environmental Engineering, 'Hydrologic Variability and the Dynamics of West Nile Virus Transmission', September 28, 2012.
Yale University, Yale Climate and Energy Institute, 'Local Hydrological and Meteorological Constraints on Infectious Disease Transmission', January 25, 2013.
University of Michigan, Robert Wood Johnson Foundation, Health and Society Scholars Program Seminar Series, The Center for Social Epidemiology and Population Health, 'Forecasting Seasonal Outbreaks of Influenza', February 5, 2013.
Yale University, Global Health Leadership Institute, Yale Schools of Medicine and Public Health, 'Absolute Humidity and the Transmission and Seasonality of Influenza, February 18, 2013.
Columbia University, College of Physicians and Surgeons, Pulmonary, Allergy and Critical Care Conference, 'Forecasting Seasonal Outbreaks of Influenza', February 27, 2013.
U.S. Department of Health and Human Services, Biomedical Advanced Research and Development Authority, Analytic Decision Support Division, 'Forecasting Seasonal Outbreaks of Influenza', March 1, 2013.
Columbia University, College of Physicians and Surgeons, Infectious Disease Fellows Conference, 'Forecasting Seasonal Outbreaks of Influenza', May 29, 2013.
University of Miami, Abess Center for Ecosystem Science and Policy, 'Forecasting Seasonal Outbreaks of Influenza', September 30, 2013.
U.S. Department of Health and Human Services, Biomedical Advanced Research and Development Authority, Analytic Decision Support Division, 'Forecasting Seasonal Outbreaks of Influenza', February 7, 2014.
Columbia University, School of International and Public Affairs, Sustainable Development Program, 'Forecasting Seasonal Outbreaks of Influenza', February 24, 2014.
Columbia University, Lamont-Doherty Earth Observatory Colloquium, 'Simulation and Forecast of Infectious Disease: Environmental Determinants and Transmission Dynamics', October 7, 2016.
Colorado University, Climate Summit Keynote Lecture, 'Climate-Disease Connections: Associations, Processes and Incorporation in Infectious Disease Forecast', October 16, 2018.
Yale University, Climate Change Leader in Residence, Yale School of Public Health, 'Infectious Disease Forecast and the Incorporation of Climate Drivers', January 14, 2019.
Yale University, Climate Change Leader in Residence, Yale School of Public Health, 'Climate-Disease Connections: Associations and Processes Affecting Infectious Disease Dynamics', January 15, 2019.
University of Notre Dame, Center for Informatics and Computational Biology, 'Forecasting the Growth and Spread of Infectious Diseases', March 20, 2019.
Carnegie Mellon University, Department of Statistics, 'Process-Based Forecasting of Infectious Disease Outbreaks', April 15, 2019.
Cary Institute, 'Forecasting Outbreaks of Infectious Disease', May 9, 2019.
University at Albany, Department of Atmospheric and Environmental Sciences and the Wadsworth Center, 'Modeling and Forecasting West Nile Virus', May 16, 2019.
Johns Hopkins University, Bloomberg School of Public Health, Department of Environmental Health and Engineering, Grand Rounds, 'Forecasting Outbreaks of Infectious Disease', October 11, 2019.
California Institute of Technology, Department of Environmental Science and Engineering, 'Transmission Dynamics of Influenza and SARS-CoV-2: Environmental Determinants, Inference and Forecast', April 29, 2020.
National Center for Atmospheric Research, 'Transmission Dynamics of Influenza and SARS-CoV-2: Environmental Determinants, Inference and Forecast', May 18, 2020.
University of Minnesota, The Institute of Mathematics and its Applications, School of Mathematics, 'Transmission Dynamics of Influenza and SARS-CoV-2: Environmental Determinants, Inference and Forecast', May 19, 2020.
National Academies' Board of Atmospheric Sciences and Climate, 'Short-term climate variability and virus seasonality', May 28, 2020.

McGill University, McGill Genome Centre, 'Transmission Dynamics of Influenza and SARS-CoV-2: Inference and Forecast', July 9, 2020.
Keck Graduate Institute, 'Modeling Influenza and SARS-CoV-2: Environmental Determinants, Inference and Forecast', July 13, 2020.
University of California, Berkeley, Berkeley Atmospheric Sciences Center, 'Modeling Influenza and SARS-CoV-2: Environmental Determinants, Inference and Forecast', September 9, 2020.
Weill Cornell Medicine, Global Health Education, 'The Implications of Climate Change on Health and Well-being in the Age of COVID-19', October 7, 2020.
Massachusetts Institute of Technology, Program in Atmospheres, Oceans, and Climate, Department of Earth, Atmospheric, and Planetary Sciences, 'Transmission Dynamics of Influenza and SARS-CoV-2: Meteorological Drivers, Inference and Forecast', October 14, 2020.
University of Minnesota, Webinar in Epidemiology and Community Health, 'Transmission Dynamics of SARS-CoV-2: Meteorological Drivers, Model Inference and Projection', October 23, 2020.

CONFERENCE PRESENTATIONS

Prediction of Mosquito Abundance with Modeled Land-Surface Hydrology, Poster Presentation at New Challenges in Tropical Medicine and Parasitology, Oxford, United Kingdom, 18-22 September, 2000
Prediction of Floodwater Mosquito Abundance with Modeled Land-Surface Hydrology, Oral Presentation at the Annual Meeting of the American Society of Tropical Medicine and Hygiene, Houston, Texas, 29 October – 2 November, 2000
Prediction of Floodwater Mosquito Abundance with Modeled Land-Surface Hydrology, Oral Presentation at the 2000 Joint Annual Meeting of the Entomological Societies of Quebec, Canada, and America, Montreal, Quebec, 3-6 December, 2000
Representation of Stormflow and a More Responsive Water Table in a TOPMODEL-Based Hydrology Model, Poster Presentation at the Chapman Conference of the American Geophysical Union on State-of-the-Art in Hillslope Hydrology, Sun River, Oregon, 8-12 October, 2001
Representation of Stormflow and a More Responsive Water Table in a TOPMODEL-Based Hydrology Model, Oral Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 10-14 December, 2001
Seasonal Forecast of St. Louis Encephalitis Virus Transmission in Forecast, Oral Presentation at the Annual Meeting of the American Society of Tropical Medicine and Hygiene, Denver, Colorado, 10-14 November 2002
Seasonal Forecast of St. Louis Encephalitis Virus Transmission in Forecast, Oral Presentation at the Annual Meeting of the Entomological Society of America, Ft. Lauderdale, Florida, 18--22 November 2002
A Local Forecast of Land Surface Wetness Conditions, Drought, and St. Louis Encephalitis Virus Transmission Derived from Seasonal Climate Predictions, Poster Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 6-10 December 2003
A Local Forecast of Land Surface Wetness Conditions, Drought, and St. Louis Encephalitis Virus Transmission Derived from Seasonal Climate Predictions, Oral Presentation at the World Water and Environmental Resources Congress of the American Society of Civil Engineers, Philadelphia, Pennsylvania, 23-26 June 2003
The Effect of ENSO on Tibetan Plateau Snow Depth and the South Asian Monsoons: A Stationary Wave Teleconnection Mechanism. Oral Presentation at the Spring Meeting of the American Geophysical Union, Montreal, Quebec, 17-21 May (Joint Assembly of AGU, CGU, SEG and EEGS) 2004
The direct effect of summertime ENSO conditions on the South Asian monsoons: barotropic and baroclinic teleconnection mechanisms. Poster Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 13-17 December 2004
The direct effect of summertime ENSO conditions on the South Asian monsoons: barotropic and baroclinic teleconnection mechanisms. Oral Presentation at the Annual Meeting of the American Meteorological Society, 16th Conference on Climate Variability and Change, San Diego, California, 9-13 January 2005
Modeling and Forecasting Local Arbovirus Transmission. EPA workshop-conference to address the practical consequences of Levins' philosophy of modeling ecological systems, H. J. Andrews Experimental Forest Station, Oregon, 12-15 January 2005.
Modeling and Forecasting Mosquito-Borne Disease Transmission. NOAA Climate and Global Change Conference Celebrating the 100th Postdoctoral Apppointment, NOAA Headquarters, Silver Springs, Maryland, 20-21 April 2005, INVITED.
Are Big Basins just the Sum Small Catchments? Oral Presentation at the Spring Meeting of the American Geophysical Union, New Orleans, Louisiana, 22-27 May 2005, INVITED.
An atmospheric teleconnection linking ENSO to the North African-Asian jet. Oral Presentation at the European Geosciences Union General Assembly, Vienna, Austria, 2-7 April 2006.
Preserving Health in a Changing Global Environment. Oral Presentation at the 12th Annual German-American Frontiers of Science Symposium of the Alexander von Humboldt Foundation and the U.S. National Academy of Sciences, Potsdam, Germany, 22-24, June 2006, INVITED.

Hydrologic Monitoring and Modeling of Mosquito-Borne Disease Transmission. Oral presentation at the Center for Discrete Mathematics and Theoretical Computer Science (DIMACS) and Center for Dynamic Data Analysis (DyDAn) Workshop of Climate and Disease, Rutgers University, Piscataway, New Jersey, 7-8 April 2008, INVITED.

The Dynamics of the ENSO-Atlantic Hurricane Teleconnection: ENSO-related changes to the North African-Asian Jet affect Atlantic Basin Tropical Cyclogenesis. Poster Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 14-18 December 2008.

Episodic Mode Water Formation: Atmospheric Controls and Trends. Poster Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 14-18 December 2008.

Southern Hemisphere PDO?: Interhemispheric symmetry suggests tropical forcing of Pacific decadal variability. Poster Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 14-18 December 2008.

Episodic Mode Water Formation: Atmospheric Controls and Trends. Oral Presentation at the CLIVAR CLIMODE/KESS Western Boundary Current Workshop, Phoenix Arizona, 15-17 January 2009.

Climate Change and Arbovirus Disease Transmission. Oral presentation at the Centers for Disease Control and Prevention and the American Mosquito Control Association 2009 National Conference on West Nile Virus. Savannah, Georgia, 19-20 February 2009, INVITED.

Climate Change and Vector-Borne Infections. Oral presentation at the Infectious Diseases Society of America Annual Meeting, 29 October-1 November 2009, INVITED.

Absolute Humidity and the Seasonal Onset of Influenza in the Continental US. Oral Presentation at the Annual Meeting of the American Meteorological Society, First Environment and Health Symposium, Atlanta, Georgia, 17-21 January 2010.

Shortcomings in Simulating the ENSO-Atlantic Hurricane Teleconnection in Climate Models. Poster presentation at the Western Pacific Geophysics Meeting of the American Geophysical Union, Taipei Taiwan, 22-25 June 2010.

Meteorological Determinants of Influenza Survival, Transmission and Seasonality. Oral Presentation at Centers for Disease Control and Prevention Workshop for Understanding the Modes of Influenza Transmission, 3-4 November 2010, INVITED.

An Atmospheric Teleconnection Linking ENSO and Southwestern European Precipitation. Poster Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 13-17 December 2010.

Absolute Humidity and the Seasonality of Influenza. Oral Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 13-17 December 2010, INVITED.

Meteorological Determinants of Epidemic and Pandemic Influenza Transmission. Oral Presentation at the NIH Models of Infectious Disease Agents Study (MIDAS) Meeting, Atlanta, Georgia, 8-10 June 2011.

Hydrologic Variability and the Dynamics of West Nile Virus Transmission. Oral Presentation at the conference Water and Health: Where Science Meets Policy, Chapel Hill, North Carolina, 3-7 October 2011.

Absolute Humidity and Transmission and Seasonality of Influenza. Oral Presentation at the annual meeting of the Geological Society of America, Minneapolis, Minnesota, 9-12 October 2011, INVITED.

Hydrologic Variability and the Dynamics of West Nile Virus Transmission. Poster Presentation at Epidemics^3, Boston, Massachusetts, 30 November-2 December 2011.

The ENSO-Pandemic Influenza Connection: Coincident or Causal? Poster Presentation at Epidemics^3, Boston, Massachusetts, 30 November-2 December 2011.

Hydrologic Variability and the Dynamics of West Nile Virus Transmission. Oral Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 5-9 December 2011, INVITED.

The ENSO-Pandemic Influenza Connection: Coincident or Causal? Union Oral Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 5-9 December 2011.

The Seasonality of Influenza and Other Respiratory Pathogens: Host-Mediated, Behavioral and Environmental Determinants. Oral Presentation at the *Seminaire de Recherche sur la Transmission* (Seminar on the Seasonality of Transmission) sponsored by Inserm, Institut Pasteur and the Institut Thematique Multi Organisme Microbiologie et Maladies Infectieuses (IMMI) d'Aviesan, Abbayes des Vaux de Cernay, France, 22-23 March 2012, INVITED.

Forecasting Seasonal Outbreaks of Influenza. Oral Presentation at the NIH Models of Infectious Disease Agents Study (MIDAS) Meeting, Atlanta, Georgia, 6-8 June, 2012.

Forecasting Seasonal Outbreaks of Influenza. Oral Presentation at the NOAA Climate and Global Change Postdoctoral Fellowship Program Summer Institute, Steamboat Springs, Colorado, 8-12 July 2012.

Forecasting Seasonal Outbreaks of Influenza. Poster Presentation at the Asia Oceania Geosciences Society-American Geophysical Union Joint Assembly, Singapore, 13-17 August 2012.

The Seasonal Effects of ENSO on Western European Precipitation: Observational Analyses and Model Simulations. Oral Presentation at the European Geosciences Union General Assembly, Vienna, Austria, 7-12 April 2013.

Real-Time Influenza Forecasts during the 2012-2013 Season. Oral Presentation at the NIH Models of Infectious Disease Agents Study (MIDAS) Meeting, Austin, Texas, 6-8 May 2013.

The Seasonal Effects of ENSO on Western European Precipitation: Observational Analyses and Model Simulations. Oral Presentation at the American Meteorological Society 19th Conference on Atmospheric and Oceanic Fluid Dynamics, Newport, Rhode Island, 17-21 June 2013.

Forecasting Seasonal Outbreaks of Influenza. Oral Presentation at the NIH Models of Infectious Disease Agents Study (MIDAS) 10th Anniversary Meeting, Bethesda, Maryland, 23 September 2013, INVITED

Forecasting Seasonal Outbreaks of Influenza. Oral Presentation at the American Society of Microbiology, Region 1 Meeting, University of Connecticut, Storrs, Connecticut, 26 October 2013, INVITED

The Effect of Hydrologic Variability on the Ecology of West Nile Virus. Oral Presentation at the American Society of Tropical Medicine and Hygiene, Annual Meeting, Washington DC, 13-17 November 2013, INVITED

Real-Time Influenza Forecasts during the 2012-2013 Season. Oral Presentation at Epidemics[4], Amsterdam, Netherlands, 19-22 November 2013.

Forecasting Seasonal Outbreaks of Influenza. Oral Presentation at the Annual Meeting of the International Society for Disease Surveillance, New Orleans, Louisiana, 11-13 December 2013, INVITED

Forecasting Seasonal Outbreaks of Influenza. Oral Presentation at the Preparedness Summit, Atlanta, Georgia, 1-4 April 2014, INVITED

Integration of Influenza Forecasts into Public Health Decision Making. Oral Presentation at the Preparedness Summit, Atlanta, Georgia, 14-17 April 2015.

Forecasting Infectious Disease Outbreaks. Oral Presentation at the conference on Human Health in the Face of Climate Change: Science, Medicine and Adaptation, Sponsored by the Caixa Foundation and the New York Academy of Sciences, 14-15 May 2015, INVITED

Climate and Tropical Infectious Disease. Oral Presentation at the American Society of Tropical Medicine and Hygiene, Annual Meeting, Philadelphia PA, 26-29 October 2015, INVITED

Forecasting Infectious Disease Outbreaks. Oral Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 13-17 December 2015, INVITED

The superposition of eastward and westward Rossby waves in response to localized forcing. Poster Presentation at the Fall Meeting of the American Geophysical Union, San Francisco, California, 13-17 December 2015.

Launch of a Global Consortium on Climate and Health Education (GCCHE). Oral presentation at the annual meeting of the American Public Health Association, Atlanta, Georgia, 5-8 November 2017.

Simulation and Forecast of Infectious Disease: Environmental Determinants and Transmission. Oral keynote presentation at the Symposium on Atmospheric Chemistry, Climate and Health, Sigma Xi, Raleigh, North Carolina, 10 November 2017, INVITED

The Use of Ambient Humidity Conditions to Improve Influenza Forecast. Oral Presentation at the Fall Meeting of the American Geophysical Union, New Orleans, Louisiana, 11-15 December 2017, INVITED

Real-time West Nile Virus Forecasts with Temperature Forcing. Oral Presentation at the Fall Meeting of the American Geophysical Union, New Orleans, Louisiana, 11-15 December 2017.

Using weather to improve infectious disease forecasts. Oral Presentation at the Consortium of Universities of Global Health Annual Meeting, New York, New York 15-17 March 2018, INVITED

Forecasting the growth and spread of infectious disease outbreaks. Oral Presentation at the *Future of Health,* the annual symposium of the Institute for Systems Biology, Seattle, Washington, 26-27 March 2018 INVITED.

Absolute humidity modulates influenza transmission. Oral Presentation at the Gordon Research Conference *The Microbiology of the Built Environment,* Biddeford, Maine, 15-19 July 2018, INVITED.

Climate and health. Oral Presentation at workshop on climate, health and bioethics, Hastings Center, Garrison, New York, 3-4 June 2019 INVITED.

Climate and influenza: associations, processes, and implications. Oral Presentation at the annual Ecology and Evolution of Infectious Diseases meeting, Princeton, New Jersey, 10-13 June 2019 INVITED.

Inference and control of the nosocomial transmission of methicillin-resistant *Staphylococcus aureus*. Oral Presentation at SPHINx19 - Spread of Pathogens in Healthcare Institutions and Networks: a modeling conference, Paris, France, 24-25 June 2019, INVITED.

Utilizing big data to track outbreaks of antimicrobial resistant pathogens. Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (PACCARB), McLean, Virginia 10-11 July 2019, INVITED.

Forecasting seasonal influenza activity. Oral Presentation at Options X for the Control of Influenza, Singapore, 28 August - September 1, 2019, INVITED.

Forecasting Infectious Diseases Both with and without Climate Forcing. Oral Presentation at the 100th Annual Meeting of the American Meteorological Society, Boston, Massachusetts, 12-16 January, 2020, INVITED.

Process-based Infectious Disease Forecasting. Oral Presentation at the Annual Meeting of the American Association for the Advancement of Science, Seattle, Washington, 13-17 February, 2020, INVITED.

Modeling the Transmission Dynamics of SARS-CoV-2 and the Effects of Intervention Timing on COVID-19 Incidence. Oral Presentation at the 38th International Conference of the System Dynamics Society, Bergen, Norway (Virtual), 19-21 July, 2020, INVITED.

Transmission Dynamics of SARS-CoV-2: Inference and Projection. Oral Presentation at Cold Spring Harbor Laboratory COVID/SARS CoV2 Rapid Research Reports #2, Cold Spring Harbor, NY (Virtual), 21-22 July, 2020, INVITED.

Symposium panel on forecasting and projecting meteorological and environmental links to COVID-19, American Geophysical Union, 4 August 2020. INVITED.

Meteorological determinants of influenza and SARS-CoV-2 survival and transmission, 32nd Annual Conference of the International Society for Environmental Epidemiology, (Virtual) 24-27 August 2020. INVITED (keynote).

Transmission Dynamics of Influenza and SARS-CoV-2: Meteorological Determinants, Inference and Forecast. AGU Webinar, 14 September 2020. INVITED.

The Health Impacts of Climate Change, 36th Annual Conference of the International Society for Pharmacoepidemiology, (Virtual) 15-17 September, 2020. INVITED.
Transmission Dynamics of SARS-CoV-2: Modeling, Inference and Projection, 1st ACM SIGSPATIAL International Workshop on Modeling and Understanding the Spread of COVID-19, (Virtual), Keynote, 3 November, 2020 INVITED.

GRADUATE COURSES: Introduction to Atmospheric Science, Climatic Change, Global Assessment and Monitoring using Remote Sensing, Nonlinear Dynamics in the Earth Sciences, Introduction to Atmospheric Chemistry, Ocean-Atmosphere Interactions, Water and Infectious Diseases, Advanced General Geology, Quantitative Methods of Data Analysis, Myths and Methods in Modeling, Dynamics of Climate, Wave Motions in the Atmosphere and Ocean, Geophysical Fluid Dynamics Seminar—Tracers, Ocean Dynamics, Tropical Oceanography, Tropical Meteorology, Physics of Fluids

TEACHING EXPERIENCE

Environmental Science for Decision Makers, Teaching Assistant (2 Semesters), School for International and Public Affairs, Columbia University.
Introduction to Atmospheric Sciences, ATS 210, undergraduate course, Oregon State University, Fall 2006.
Principles of Atmospheric Sciences, ATS 420/520 graduate course, Oregon State University, Fall 2007.
Special Topics, El Niño-Southern Oscillation climate variability in the past, present and future, OC669/ATS690 graduate course, Oregon State University, Spring 2008.
Principles of Climate, ATS 420/520 graduate course (new version of Principles of Atmospheric Sciences) Oregon State University, Fall 2008.
Climate Dynamics, ATS 630, graduate course, Oregon State University, Spring 2010.
The Fluid Earth, OEAS 430/530 graduate course (new core curriculum course for COAS), Oregon State University, Fall 2010.
Journal Club in Environmental Health: Climate and Health, EHSC 9370, graduate seminar course, Columbia University, Fall 2011.
Climate and Atmospheric Science for Public Health, P8301, graduate course, Columbia University, Fall 2012, Fall 2013, Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018, Fall 2019, Fall 2020.
Water, Sanitation and Human Health, P8329, graduate course, Columbia University, Spring 2014, Spring 2015, Spring 2016, Spring 2017, Spring 2018.
Environmental Science, Senior Seminar, X3801, undergraduate course, Columbia University, Spring 2014, Fall 2014, Spring 2015.
Public Health Impacts of Climate Change, P8304, graduate course, Columbia University, Spring 2017, Spring 2018.
Seminar in Climate and Health, P8324, graduate seminar course, Columbia University, Spring 2017, Spring 2018, Spring 2019, Spring 2020.

PROFESSIONAL ACTIVITIES

Professional Organizations

American Geophysical Union
American Meteorological Society
International Society for Infectious Diseases
International Society for Disease Surveillance

Center and Institute Memberships

Center for Communicable Disease Dynamics, Harvard University, 2009-present
Columbia Center for Environmental Health in Northern Manhattan, 2011-present
Columbia Institute for Social and Environmental Research and Policy, 2011-present
International Research Institute for Climate and Society, 2011-present
Columbia Earth Institute, 2012-present

Conference Session Chair, Workshop Convener, Meeting Organizer

36th Annual Meeting of the Society of Vector Ecology, 'Fact or Fiction: Using Technology to Monitor and Forecast Vector-Borne Disease', Session Chair, Boston, MA, September 2004
National Research Council Ad Hoc Committee to plan and conduct workshop in San Francisco on the Potential Impacts of Climate Change on Human Health. Sponsored jointly by the Roundtable on Environmental Health Sciences, Research and Medicine and the NRC Climate Research Committee, March-September, 2007.
National Academy of Science, Sackler Colloquium, *Fostering Interdisciplinary Advances in Climate Science*. Co-Organizer. Washington DC, March 31-April 2, 2011.
Asia Oceania Geosciences Society-American Geophysical Union Joint Assembly, Session Convener and Chair, 'Geophysical Drivers of Infectious Disease Transmission', Singapore, 13-17 August 2012.
NIH RAPIDD Workshop, Next Generation Modeling: Climate, Weather and Infectious Disease, Co-Organizer. Princeton NJ, January 15-17, 2014.

NIH/Columbia Workshop, Preparing for and Responding to Influenza Outbreaks: Public Health Decision Making and a Role for Influenza Forecast, Organizer, New York NY, May 1-2, 2014.
NSF/Columbia Workshop, The Tropics Rule: a symposium honoring Mark Cane's contributions to climate science, Co-Organizer, Palisades NY, October 20-21, 2014.
Preparedness Summit, Learning Session, Using Forecasts to Guide Decision Making during Influenza Seasons and Pandemics, Co-Organizer, Atlanta GA, April 17, 2015.
NIH/Columbia Workshop, Preparing for and Responding to Influenza Outbreaks: Healthcare Preparedness and a Role for Influenza Forecast, Organizer, New York NY, April 21-22, 2016.
Annual Meeting the NIGMS MIDAS Program, Organizer, Atlanta GA, May 22-24, 2017.

Workshop Participation

EPA workshop-conference to address the practical consequences of Levins' philosophy of modeling ecological systems, H. J. Andrews Experimental Forest Station, Oregon, 12-15 January 2005.
CLIVAR CLIMODE/KESS Western Boundary Current Workshop, Phoenix, Arizona, 15-17 January 2009.
Hydrosynthesis, water and human interactions workshop, Chapel Hill, North Carolina, 21-22 October 2010.
Centers for Disease Control and Prevention Workshop, Understanding the Modes of Influenza Transmission, Atlanta, Georgia, 4-5 November 2010.
RAPIDD 2011 Convocation, National Institutes of Health, Washington DC, 26-27 January 2011.
RAPIDD Workshop, Modelling Interventions and Malaria Resistance, London, England, 19-20 May 2011.
RAPIDD 2012 Convocation, National Institutes of Health, Washington DC, 2-3 February 2012.
RAPIDD Workshop, Modelling Interventions and Malaria Resistance, Durham, England, 11-12 April 2012.
National Oceanic and Atmospheric Administration Climate and Global Change Postdoctoral Fellowship Program Summer Institute, Steamboat Springs, Colorado, 8-12 July 2012.
Yale Climate and Energy Institute, Forum on the Integration of Climate Science and Infectious Disease Research, New Haven, Connecticut, 25-26 January 2013.
RAPIDD 2013 Convocation, National Institutes of Health, Bethesda, MD, 13-14 June 2013.
RAPIDD 2014 Convocation, National Institutes of Health, Bethesda, MD, 4-5 September 2014.
Dengue Forecasting Workshop, Office of Science and Technology Policy, The White House, Washington DC, 15 September 2014.
Ebola Forecasting Workshop, Biomedical Advanced Research and Development Authority, Washington DC, 15 December 2014.
RAPIDD Workshop, Ebola Modeling, Bethesda MD, 23-25 March 2015.
WHO Second Global Conference on Health and Climate, Paris France, 7-8 July 2016.
ASPPH Webinar on Environmental Health Programming that Inspires and Excites, 7 October 2019.
National Academies of Science, Engineering and Medicine, Harnessing data to strengthen community health in a changing climate: a virtual scoping meeting, 25 August 2020.

National Committees, Panels, Reviews

Peer Review Panel for EPA STAR Grant 'An Interdisciplinary Approach to Examining Links Between Social Stressors, Biodiversity and Human Health', July 17-18, 2007.
External Reviewer, National Academy of Science, Institute of Medicine, Workshop Summary, 'Global Climate change and Extreme Weather Events: Understanding the Contributions to the Emergence, Reemergence, and Spread of Infectious Disease', 2008.
National Academy of Science, Climate, Energy and National Security, Topical Panel Meeting, San Francisco, CA, 24-25 June 2009 (Continued activity through 2010).
Peer Review Panel for NIH NIAID Centers of Excellence for Influenza Research and Surveillance, 3-5 June, 2013.
Review Panel for NIH NIAID K awards, Microbiology and Infectious Disease Research Committee, 20 February, 2015.
MIDAS Steering Committee, 2014-2018
MIDAS Executive Committee, 2016-2018
MIDAS Executive Committee, Vice Chair, 2016-2018
IRAP, NIH Study Section, 2019-present

State, Local and University Committees

Organizer, Division of Climate and Physical Oceanography Seminar Series, Lamont-Doherty Earth Observatory, 2001
Committee Member, Women in Science: Evaluation of Observatory Policies and Practices, Lamont-Doherty Earth Observatory, 2001-2002.
Student Representative, Curriculum Reform Committee, Department of Earth and Environmental Sciences, Columbia University, 2001-2003.
Convener, Symposium: 'Fact or Fiction: Using Technology to Monitor and Forecast Vector-Borne Disease', 36th Annual Meeting of the Society of Vector Ecology, Boston, September 2004.
Faculty Advisory Committee, COAS, OSU, 2005-2006.
Dean's Advisory Committee, COAS, OSU 2006-2009.
Frontiers Seminar Committee, COAS, OSU 2006-2009.

Discovery and Research Panel, The Future of Ocean and Coastal Studies at OSU, March 13 2007.
Climate Change Ecosystem Preparation Strategy Meeting, Oregon Department of Energy, June 11, 2007.
Earth System Science, Structure and Governance Committee, OSU, 2007.
Earth System Science, Research Committee, OSU, 2007-2008.
Atmospheric Science Hire Search Committee, COAS, OSU, 2007-2008.
Promotion and Tenure Committee, COAS, OSU, non-voting, 2008-2009.
Core Curriculum Planning Group, COAS, OSU, 2008-2009.
Core Curriculum Development Group, COAS, OSU, 2009-2010.
Peer Review of Teaching Committee, COAS, OSU, 2010-2011.
Atmospheric Science Hire Search Committee, COAS, OSU, 2010-2011.
COAS-Geosciences Merger Committee, COAS, OSU, 2010-2011.
MPH Admissions Committee, Mailman School, Columbia University, 2011-present
Earth Institute Postdoctoral Fellows Admissions Committee, Columbia University, 2011-2018
Earth Institute Director Search Committee, Columbia University, 2016-2018
Columbia University Capital Campaign Climate Task Force, 2017
Earth Institute Executive Committee, Columbia University, 2017-present
Earth Institute Leadership Committee, Columbia University, 2018-present
Columbia University Task Force on Climate, 2019
Columbia Climate School, Major Programs Director, 2020-present

EDITORIAL ACTIVITIES

Manuscripts Reviewed for: *International Journal of Climatology, Climatic Change, Global Change Biology, Journal of Medical Entomology, Ecological Modelling, Journal of Climate, International Journal of Remote Sensing, Hydrological Processes, Geophysical Research Letters, Journal of Geophysical Research, PLoS ONE, Vector-Borne and Zoonotic Diseases, Quarterly Journal of the Royal Meteorological Society, Water Resources Research, Atmospheric Research, PLoS Medicine, PNAS, PLoS Neglected Tropical Diseases, Journal of Vector Ecology, Journal of the Atmospheric Sciences, American Journal of Epidemiology, Environmental Health Perspectives, Entomologia Experimentalis et Applicata, Malaria Journal, Acta Tropica, Proceedings of the Royal Society B, Transactions of the Royal Society of Tropical Medicine and Hygiene, Environmental Health, Journal of the Royal Society Interface, International Journal for Environmental Research and Public Health, BioMed Central Infectious Diseases, American Journal of Tropical Medicine and Hygiene, Journal of Theoretical Biology, Journal of the Meteorological Society of Japan, Epidemiology and Infection, Ecology Letters, WIREs Climate Change, Climate Dynamics, PLoS Computational Biology, International Journal of Biometeorology, Influenza and Other Respiratory Viruses, PLOS Currents Influenza, Disaster Medicine and Public Health Preparedness, Scientific Reports, PLOS Currents Outbreaks, Nature Climate Change, BMC Infectious Diseases, Epidemics, eLife, PLOS Biology, Nature Communications, Nature, Science, Science Translational Medicine, Nature Human Behavior, Emerging Infectious Diseases*

Proposals Reviewed for: *NSF Climate and Large-Scale Dynamics; NOAA Climate Prediction Program for the Americas; Wellcome Trust; Ministry of Earth Sciences Monsoon Mission II, India; Swiss NSF*

Review Panels: *EPA Biodiversity and Human Health, NIH Centers of Excellence for Influenza Research and Surveillance, NIAID Microbiology and Infectious Disease Research Committee K Awards, NIH IRAP Study Section (2019, 2020)*

Guest Editor: *PNAS, International Journal for Environmental Research and Public Health, PLOS Computational Biology, PLOS Medicine, PLOS Biology*

Academic Editor: *PLOS ONE,* 2014-present

Editor: *PLOS Currents Outbreaks*, 2015-2018

OUTREACH

Interview on topic of Climate and Health, *Geotimes.* Printed in January 2006 article entitled 'Warming Linked to Disease Outbreaks'
Interview and OSU Press Release: *New Strategy Developed to Combat West Nile Virus,* Published online on www.medicalnewstoday.com, www.medilexicon.com, www hospitalwworldwide.com. Picked up by the Associated Press, printed online on many other news sites, including www medindia net. Published in print May 15, 2006 *Oregonian.*
Lecturer, Climate Impacts, Oregon State University Academy for Lifelong Learning, May 2006.
Lecturer, Climate and Health, Oregon Teachers Climate Change Workshop, September 2006

Radio interview discussion of climate, pollution and health on Oregon Territory of Oregon Public Broadcasting. Broadcast December 1, 2006. Available online at http://www.opb.org/programs/oregonterritory/episodes/2006/1201/.
Interview on climate science consensus, *Houston Chronicle,* Printed in January 22, 2007 entitled 'Climate Scientists Feeling the Heat'.
Lecturer, Climate Change and IPCC 4th Assessment, OSU Sustainability Group, February 20, 2007.
Lecturer, Climate Change, Human Health and Local Ecology, Earth Day Celebration, Hatfield Marine Science Center, April 21, 2007.
Lecturer, Climate Change and IPCC 4th Assessment, Isaac Walton League, Corvallis, June 11, 2007.
Lecturer, Climate Change and IPCC 4th Assessment, League of Conservation Voters, Newport, June 15, 2007.
Lecturer, Climate Change and IPCC 4th Assessment, The Seminar Group, Global Warming and the Effects on Environmental Law, Portland, OR, September 26, 2007.
Lecturer, Climate Change, Human Health and Local Ecology, Marys Peak Chapter, Oregon Sierra Club, Corvallis, OR, October 2, 2007.
Lecturer, Climate Change and IPCC 4th Assessment, 63rd Annual Conference of the Oregon Public Health Association, Corvallis, OR, October 3, 2007.
Speaker, Operational Hydrologic Monitoring of Mosquito-Borne Disease Transmission, Oregon Department of Health, Portland, OR, December 12, 2007.
Developer, with individuals at the Florida Medical Entomology Laboratory, of the arboviral transmission risk model: http://mosquito.ifas.ufl.edu/MWTD_Risk_Model htm
Lecture and Debate, Climate Change, Philomath High School, Earth Awareness Day, Philomath, OR, February 29, 2008.
Testimony on Climate Change and IPCC 4th Assessment before the Oregon State Legislature Committee on Energy and Environment, April 4, 2008.
Speaker, Operational Hydrologic Monitoring of Mosquito-Borne Disease Transmission, Epidemiologists' Forum, Oregon Public Health Association, Oregon Public Health Division, Oregon Health Sciences University Department of Public Health and Preventive Medicine, Portland, OR, April 16, 2008.
Lecturer, Climate Change Science, Meadow Park Middle School Science and Robotics Teams, October 10, 2008
Interview, Adult Education Instructor, Ocean Science and Math Collaborative Program of the Oregon Office of Community College and Workforce Development, October 16, 2008.
Radio interview discussion of climate change on Sunday at Noon of KLCC Public Radio, Eugene, OR. Broadcast November 16, 2008. Available online at www klcc.org/audio/S@N 11-16 mp3
Multiple interviews regarding February 9, 2009 release of influenza and humidity article in *PNAS*. Over 300 radio, print, television and online news sources covered the findings including Science, National Geographic, Scientific American, New York Times, Discover Magazine, U.S. News and World Report, MSNBC, CNN, The Today Show, Wall Street Journal and International Herald Tribune.
Consultation with officials at the Centers for Disease Control and Prevention and Mexican ministries regarding the fate and spread of swine flu, April 26-29, 2009.
Interview for National Geographic, April 29, 2009, regarding the emergence and spread of swine flu. Published online April 30, 2009, Summer to Kill Swine Flu in U.S. and Mexico? Additional interviews regarding swine flu with the Atlanta Journal-Constitution and Bay Area News.
Speaker, OSU Global Environmental Change Organization, Climate Change Seminar Series, April 29, 2009.
Speaker, Climate, Weather and Influenza, Military Officers Club of Corvallis, September 16, 2009.
Speaker, Climate, Weather and Health, Oregon Health Sciences University School of Nursing Faculty and Staff, October 14, 2009.
Lecturer, Humidity and the Seasonality of Influenza, Oregon State University Extension Service Climate Change Series, Hillsboro, OR, November 17, 2009.
Multiple interviews regarding February 23, 2010 release of influenza article in *PLoS Biology*. Interviews with Oregon Public Radio, KGW Channel 8 Portland, KEZI Channel 9 Eugene, Voice of America, Discovery Channel (online), NIH Research Matters and an NIH podcast. Additional coverage in L.A. Times, U.S. News and World Report, USA Today, Business Week, Times of India, MSNBC, and other news sources. KGW broadcast picked up by local affiliates around the country.
Interview for Religion Dispatches, March 17, 2010, on global warming. Article entitled 'Creationism and Global Warming Denial: Anti-Science's Kissing Cousins?' by Lauri Lebo.
Interview for Science News, September 8, 2010 on influenza. Article entitled 'Dry air might boost flu transmission', published September 10, 2010, by Janet Raloff.
Multiple interviews regarding January 17, 2012 release of influenza article in *PNAS*. Interviews with BBC, Huffington Post, Climate Wire, Voice of America, Australian Broadcasting Corporation Radio, Toronto Globe and Mail, Toronto Star, Canadian Press, Earth Magazine (American Geosciences Institute). Additional coverage with UPI, CBC, Houston Chronicle, Guardian, Oregon Public Radio, Scientific American and other news sources.
Consultation with officials at the Centers for Disease Control and Prevention on the emerging H3N2v swine variant at state fairs, the risk of a larger outbreak, and the merits of developing a vaccine against this variant., September 4-7, 2012.
Multiple interviews regarding November 26, 2012 release of influenza prediction article in PNAS. Interviews with NBC Nightly News, ABC World New Tonight, CBS Early Show, CBS Up to the Minute, CBS Radio, the Associated Press,

Reuters-Thomson, CTV, and local radio and print outlets. AP and Reuters coverage in both print and television appeared on hundreds of outlets.

Several interviews regarding August 2013 online release of weather and depression article in *J. Affective Disorders.* Press coverage appeared in multiple print outlets around the globe.

Multiple interviews regarding December 3, 2013 release of influenza prediction article in *Nature Communications*. Interviews with Time, Bloomberg News. Coverage on Salon, Huffington, Fox News, VOA.

Multiple interviews regarding January 2014 launch of influenza prediction website. Interviews with NY1, New York Times.

Multiple interviews regarding 2014 West African Ebola outbreak and forecasts of the epidemic. Interviews with the New York Times, NBC Nightly News, NPR, ABC, CBS Affiliates, Bloomberg News.

Multiple interviews regarding 2014-2015 influenza season and its forecast. Interviews with the New York Times, Time magazine, NY1, Village Voice, CNN.

Interview October 2015 on Science Friday regarding influenza prediction

Interviews with NBC news (online) and Radio Times (WHYY) regarding the Zika outbreak, 2016

Organized and moderated an Earth Institute Sustainable Development seminar, open to the public, on the ongoing Zika outbreak, 2016.

Co-organized and participated in an event revealing preliminary results from summer 2016 respiratory virus and microbiome sampling among visiter to the American Museum of Natural History. The event was held at the museum July 14, 2016.

Podcast with *Scientific American* regarding the *PLOS Computational Biology* publication on flu prediction within New York City, December 6, 2016.

Webinar for New York Academy of Science Junior Academy on the Ebola Outbreak and infectious disease forecasting. January 19, 2017.

Public Lecture, Taste of Science, Ryan's Daughter, 350 E. 85th St., January 24, 2017.

Interviewed and participated in the WNYC Only Human podcast Flu-dunnit?, March 22, 2017.

Interviewed for Stat News on climate and health, April 11, 2017 (released April 24, 2017).

Interviewed by ABC news (online) regarding climate and health, June , 2017.

Interviewed by Metro, Australian Financial Times and other regarding *PNAS* publication on spatial forecast of influenza, February 2018.

Letter to the Editor in New York Times, 'One more thing you can do', regarding climate and health, (https://www.nytimes.com/2018/10/08/opinion/letters/science-health-climate-environmental-protection-agency.html) October 8, 2018.

2019: Interviews with Columbia Magazine, Columbia Public Health Magazine, the Montgomery Advertiser

Podcast with US Green Building Council, *Built for Health: Climate,* released October 21, 2019.

Interview with NPR regarding the Wuhan novel coronavirus, aired on *All Things Considered* February 5, 2020

Interview with PRI World on climate and infectious disease, February 5, 2020.

Interview with BBC Science in Action on COVID-19, February 15, 2020; aired February 20, 2020

Interviews with *Washington Post, New York Times, CNBC, The Hill, China Global TV, CBS News, Axios, China Daily USA, Wall Street Journal, Buzzfeed News (AM2DM), Bloomberg News, Vice News, Al Jazeera English, NBC News, Weather Underground, New Yorker, ProPublica, BBC World, Morning Joe, Chicago Tribune, NPR All Things Considered, NPR Here and Now, National Geographic, NOVA, BBC Horizons, CNN Situation Room, Science Friday, BBC Panorama, NHK Japan, NBC Meet the Press, CNN with Don Lemon, PBS News Hour, The Rachel Maddow Show, CTV, The Takeaway* among others regarding COVID-19 outbreak, February-December, 2020

Interview with The Weather Channel regarding influenza and respiratory forecasting, aired February 26, 2020

Podcast interview with The Environmental Breakdown on climate change and infectious disease and COVID-19, released March 13, 2020.

Advised governors of Washington and Ohio, congresspeople, state department, NY, VT, ME, CA and HI State officials, NYC mayor's office, NYC Economic Development Council, MD State Assembly, Directors Guild of America, NYC Campaign Finance Board on COVID-19 response, March-December 2020.